KLMBPLUS
DDE
Server

for Microsoft Windows
and InTouch Applications

User Manual
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KLMBPLUS DDE Server

Overview

The **KLMBPLUS** DDE Server is a Microsoft Windows application program that acts as a DDE (Dynamic Data Exchange) Server that allows other Windows application programs access to data from Modicon PLCs in Modbus Plus network. The **KLMBPLUS** DDE Server requires the SA85 Adapter Card or PCI85 Adapter Card and corresponding software to access the Modbus Plus network - the 32-bit MBX Driver or Modicon “Local Netlib Library” drivers (only with SA85) for Microsoft Windows (95/98/ME/NT/2000) operating system, providing connectivity between Modicon ModConnect host interface adapters and 32-bit applications running under MS Windows.
One or two Adapter cards may be installed on the computer and each Adapter Card provides an interface to as many as 32 PLCs. The DDE Server supports Modicon 484, 584/984, AT984, MC984 PLCs, Bridge Plus and Bridge Mux.
The KLMBPLUS DDE *Server* is primarily intended for use with **Wonderware InTouch** (version 3.01 and later), but it may be used by any Microsoft Windows program that is capable of acting as a DDE *Client*.

What is DDE?

DDE is a complete communication protocol designed by Microsoft to allow applications in the Windows environment to send/receive data and instructions to/from each other. It implements a *client-server* relationship between two concurrently running applications. The *server* application provides the data and accepts requests from any other application interested in its data. Requesting applications are called *clients*. Some applications such as **InTouch** and Excel can simultaneously be both a *client* and *server.*

To obtain data from another application the *client* program opens a channel to the *server* application by specifying three things: the *server* ***application name***, the ***topic name*** and the specific ***item name***. For example, in the case of Excel, the application name is "Excel", the topic name is the name of the specific spreadsheet that contains the data and the item name is the specific cell on the spreadsheet. With **InTouch** the application name is "View", the topic name is the word "Tag name" when reading/writing to an **InTouch** tag name and the item name is a specific tag name in the **InTouch** Data Dictionary.

When a *client* application sets up a link to another DDE program, it requests the *server* application to *advise* the *client* whenever a specific item's value changes. These data links will remain active until either the *client* or *server* program terminates the link or the conversation. They are a very efficient means of exchanging data because once the link has been established no communication occurs until the specified data value changes. **InTouch** uses DDE to communicate with I/O device drivers and other DDE application programs.

Accessing a Remote DDE Item from KLMBPLUS

The DDE protocol identifies an element of data by using a three-part address, including: **Application, Topic and Item.**

Application

The name of the Windows program (server) that will be accessing the data element. In the case of data coming from or going to Modicon equipment via this DDE Server, the application portion of the DDE address is KLMBPLUS.

Topic

Meaningful name(s) are configured in the DDE Server to identify specific devices. These names are then used as the topic name in all DDE conversations to that device. For example, ModSlave5.

Note: *To poll different points at different rates, multiple topic names can be defined for the same device.*

Item

A specific data element within the specified topic. For example, when using this DDE Server, an item can be a Coil, Contact, Input Register, Holding Register, etc., in the PLC. Special items are used to control the Server execution from client application. (The item/point names are fixed by the KLMBPLUS Server as described in the chapter ***Item (Point) Naming***)

Note: *In some cases, the term "point" is used interchangeably with the term "item".*

Installing Modbus Plus Network and Configuring Drivers

Install and configure the Modicon hardware and Modicon Modbus Plus network according to the *"Modicon Modbus Plus Network Planning and Installation Guide".*

In case of **SA85** Interface adapter - install the **SA85** in the computer and configure as a Modbus Plus Network node according to the *"*Modicon IBM Host Based Devices User's Guide*"*. The following drivers can be used with **SA85**:

- either the MODICON 32-bit Local NETLIB library drivers,
- or Cyberlogic's MBX Drivers.

In case of **PCI85** Interface adapter - only **MBX Drivers** are used to access the Modbus Plus network from MS Windows.

Installation of Windows NT-based Local Netlib Library drivers.

When use "so called" MS Windows NT-based **Local Netlib Library** for Modicon Modconnect Host Interface Adapter Local Netlib then follow "Modicon Local NETLIB Library User Guide" for installation. After installation:
the **Kernel Device Driver (MBPLUS.SYS)** must be in the \WINNT\SYSTEM32\DRIVERS directory on your computer,
the Modicon Modbus Plus API for the Kernel Device Driver (**MBPAPI.DLL**),
the Modicon Modbus Plus NetBIOS Interface (**NETLIB.DLL**) software,
the **MBPCTRS.DLL, MBPEDTSA.DLL** and **NETLIB.DLL** files must be in \WINNT\SYSTEM32\ on your computer.

Further, after KLMBPLUS Server installation, the files MBPAPI.DLL and NETLIB.DLL must be copied to directory of the KLMBPLUS.EXE file location.

Note: *It is recommended to configure Adapter cards immediately after drivers installation using specialized MBPLUS configuration software what offers the installation program. It is good practice to create HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\MBPLUS key in the Registry (see chapter* ***Adapter Card Settings****) in such way.*

Installation of Cyberlogic's MBX Drivers.
Install MBX drivers and configure a kernel mode device driver that requires a number of parameters to be specifically set to match the configuration of the devices. A utility called *MBX Device Configuration* is used to create and edit devices.
For more information on configuring the PCI-85 Interface adapter using the MBX Driver refer to Modicon Modbus Plus PCI-85 Interface Adapter User's Guide.

(The KLMBPLUS Server is checked with MBX Drivers version 4.0 and 4.20)

Installing the KLMBPLUS DDE Server

KLMBPLUS DDE Server must be installed from **Administrator** account or from other privileged account with **Administrator** privileges.

The KLMBPLUS DDE Server installation package can be supplied:

1. As a self-extracting archive 28010xxx.EXE if downloaded from Klinkmann's web site (the xxx is the current (latest) version of the Server).
2. From installation on CD.
3. On two or three distribution disks (floppies).

To **install** the KLMBPLUS Server from the self-extracting archive, run the 28010xxx.EXE and proceed as directed by the KLMBPLUS Server Setup program.

To **install** the KLMBPLUS Server from CD or distribution disks, on MS Windows:

1. Insert the CD with Klinkmann Software into CD drive or insert the KLMBPLUS Server Disk1 into a floppy drive A: or B:.
2. Select the **Run** command under the **Start** menu.
3. Run STARTUP.EXE if installing from CD or SETUP.EXE if installing from distribution disks (floppies).
4. If installing from CD: select "Protocol Servers (DDE, SuiteLink, OPC)", find "KLMBPLUS DDE Server" and click on "Setup…".
5. Proceed as directed by the KLMBPLUS Server Setup program.

When installation is finished, the subdirectory specified as a folder where to install the KLMBPLUS Server files will contain the following files:

KLMBPLUS.EXE The KLMBPLUS DDE Server Program. This is a Microsoft Windows 32-bit application program.

KLMBPLUS.HLP The KLMBPLUS DDE Server Help file.

KLMBPLUS.CFG An example configuration file.

WWCOMDLG.DLL Dynamic Link Library necessary for KLMBPLUS DDE Server.

LICENSE.TXT Klinkmann Automation software license file.

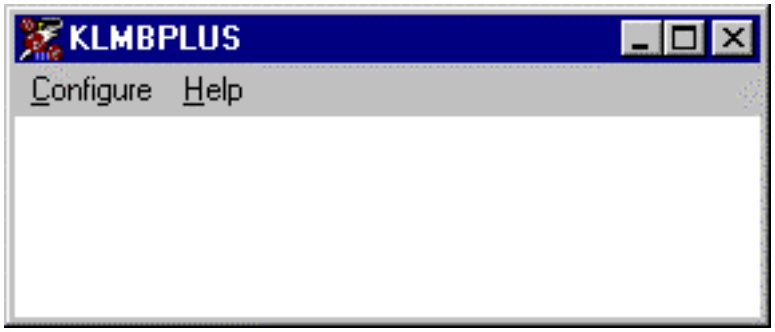
To **uninstall** the KLMBPLUS DDE Server, start Control Panel, select "Add/Remove Programs" and select "KLMBPLUS DDE Server" from the list of available software products. Click on "Add/Remove…" and proceed as directed by the UnInstallShield program.

Notes:
1. *The HASP key is needed for full time running of KLMBPLUS DDE Server. The HASP Driver setup is performed during the Server setup. Without HASP Driver installed the Server will run only 1 hour (with all features enabled).*

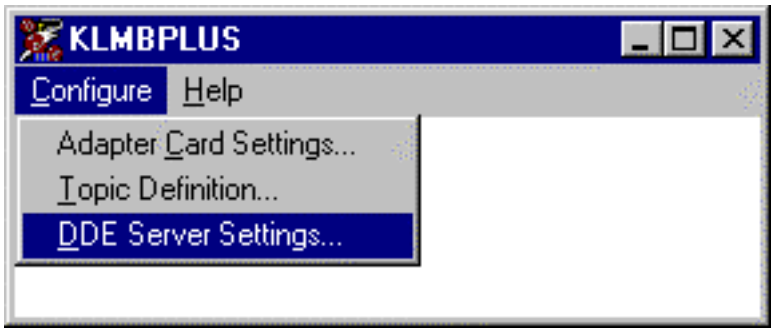
Configuring the KLMBPLUS Server

Once the DDE Server has been installed, a small amount of configuration is required. Configuring the Server automatically creates a configuration file named, KLMBPLUS.CFG. This file stores the configuration information for the adapter card settings and all of the topic definitions.

The configuration file is automatically saved to the directory in which the DDE Server is installed unless a different directory is specified via the DDE Server Settings... command.

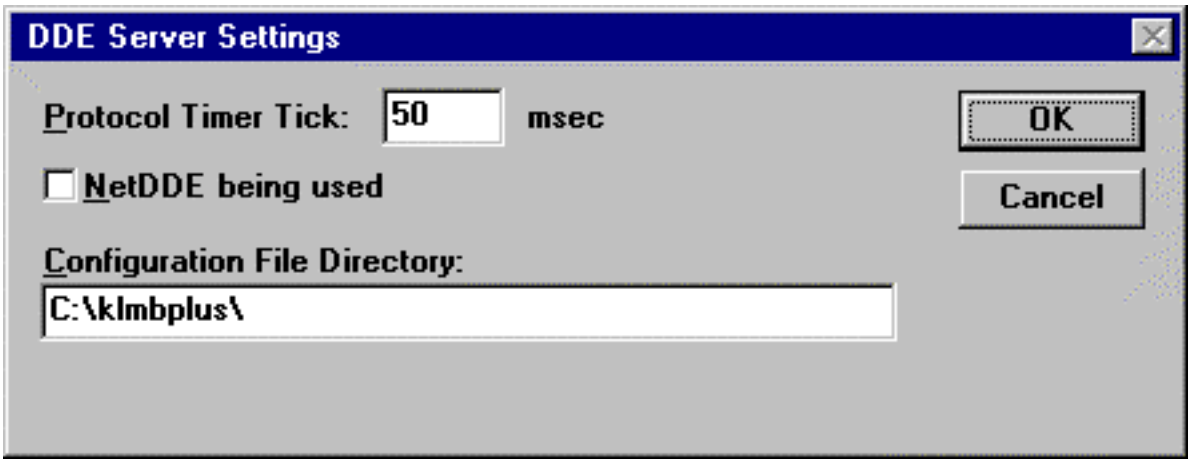


To access the commands used for the various configurations, open the /DDE Server Settings Menu



DDE Server Settings Command

A number of parameters that control the internal operation of the Server can be set. In most cases, the default settings for these parameters provide good performance and do not require changing. However, they can be changed to fine-tune the Server for a specific environment.
To change the Server's internal parameters, invoke the **DDE Server Settings...** command. The "DDE Server Settings" dialog box will appear:



The following describes each field in this dialog box:

Protocol Timer Tick
Enter the frequency (in milliseconds) that the Server is to check for data to process. This should be approximately two to four times faster than the fastest rate desired to update data from the equipment.

NetDDE being used
Select this option if you are networking using NetDDE.
.
Configuration File Directory
This field displays the drive\directory into which the Server will save the current configuration file. To save the configuration file to a different directory, enter the path for that directory in this field.

Note: *Only the "path" may be modified with this field. The configuration file is always named* ***KLMBPLUS.CFG****.*
Note: *There is no limit to the number of configuration files created. However, each must be saved in a different directory. When using the DDE Server with* ***InTouch****, we recommend that you save the configuration file in your application directory. For more information on the Configuration File, refer to the "Saving KLMBPLUS Configuration File " Help topic.*

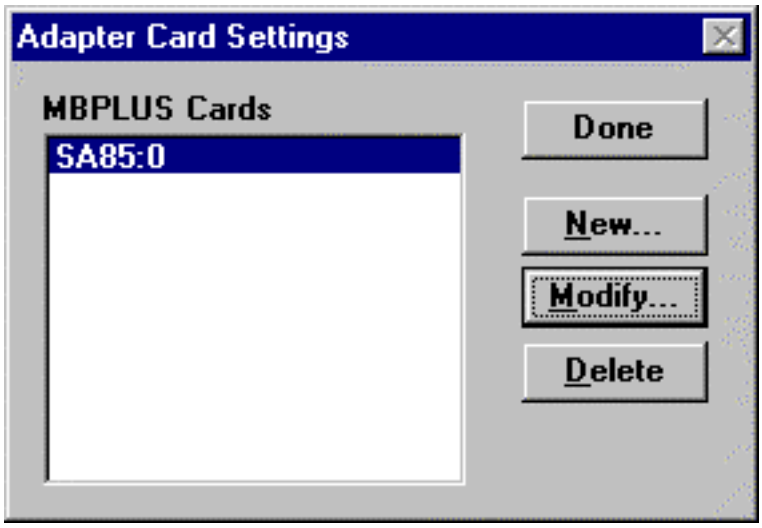
Once all entries have been made, click on **OK**.

Adapter Card Settings

This command is used to create new, modify or delete Adapter card definitions. When this command is invoked, the "Adapter Card Settings" dialog box will appear.

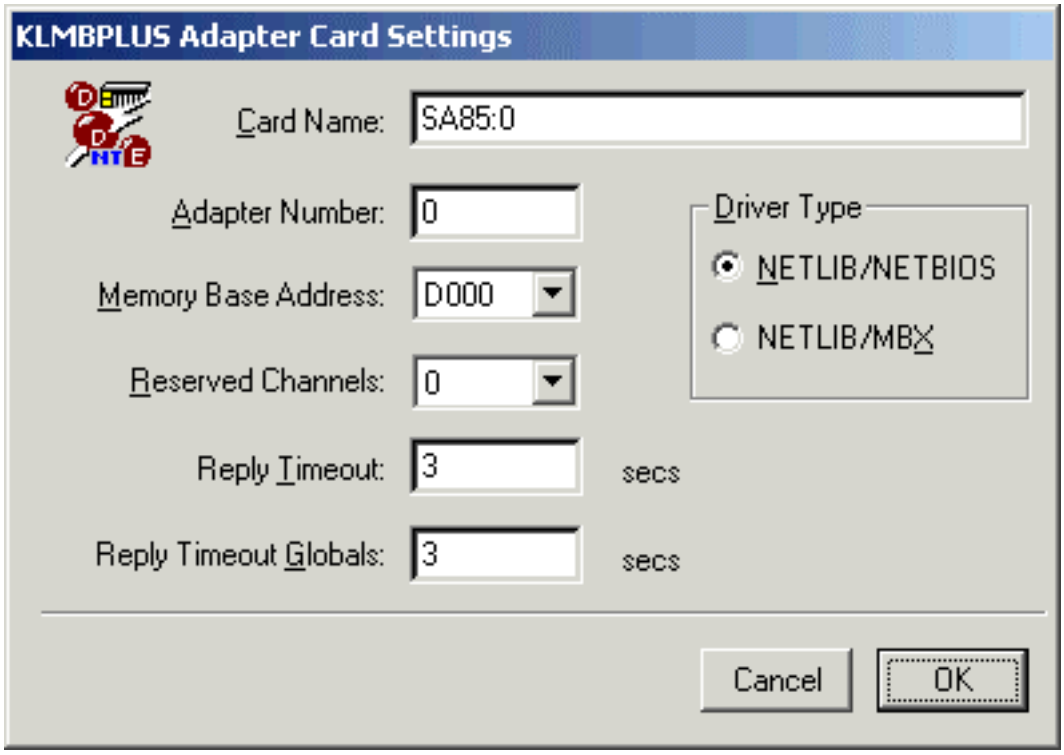
The following note is relevant in case of Modicon Local Netlib Library drivers (not MBX drivers): *When the* ***Adapter Card Settings...*** *command is invoked- the Server firstly checks whether it has rights to change the* ***Registry*** *settings. If Registry settings are accessible then the "Adapter Card Settings" dialog box is displayed immediately and all configuration parameters in the dialog box are available.*
If you have no privileges to change the Registry settings then the following message box will be displayed: ***" You will not be allowed to save modifications to registry parameters. You do not have Registry update privileges."***
In this case the Server is useful only if Kernel Mode Device Drivers are previously correctly configured (and ***Registry*** *contains correct settings). For more information refer to the chapter* ***Adapter Card Settings without Administrator Privileges****.*

The following section refers to all users in case of MBX drivers as well as to users that log on to MS Windows with **Administrator** privileges or users with assigned rights to change the **Registry** settings in case of Modicon Local Netlib Library drivers.



When the "Adapter Card Settings" dialog box appears - Click on **New…** to create a new or click on **Modify** to examine the characteristics of the selected Card.

The "KLMBPLUS Adapter Card Settings " dialog box will appear:



The following describes each dialog field in this dialog box:

Card Name
This field is used to enter the unique name for the Adapter card. (This name will be used in topic definitions to associate a topic with a specific Adapter card).

Adapter Number
Select the Adapter Number assigned to SA85 (or PCI85) card.
Note: *With Local Netlib Library drivers, when using KLMBPLUS DDE Server with one SA85 Adapter card installed in the computer, Adapter Number should be* ***0****.*
If additional Adapter card is attached then it's number should be ***1****.*

Memory Base Address
This dialog option is relevant only with Local Netlib Library drivers.
Select the memory address set in the "memory window" switch on the SA85 Adapter card when it was installed. The value to be entered here is the segment or paragraph address, not the byte address. For example, if the memory window was assigned to D0000 - select D000 in this field.

Reserved Channels
This dialog option is relevant only with Local Netlib Library drivers.
Select a number between 0 and 7. This is the number of Modbus Plus channels reserved for other programs to use. It is not recommended to use the Modbus Plus DDE Server and the Modsoft programming software at the same time with a single SA85 card. However, if you choose to run Modsoft and the DDE Server at the same time, be sure you reserve a channel for Modsoft.

Reply Timeout
Enter the amount of time (in seconds) that all PLCs connected via this Adapter card will be given to reply to commands from the DDE Server.
***Note**: This time-out is sustained only when the PLC fails to respond. When the PLC is responding normally, there is no penalty. The default value of three seconds should be sufficient for most configurations.*

Reply Timeout Globals
Enter the amount of time (in seconds) to reply for reading Global Data from the Modbus Plus network.

Driver Type
Select **Netlib/Netbios** option if Modicon Local Netlib Library drivers are installed on computer.
Select **Netlib/MBX** option if Cyberlogic's MBX drivers are installed on computer.

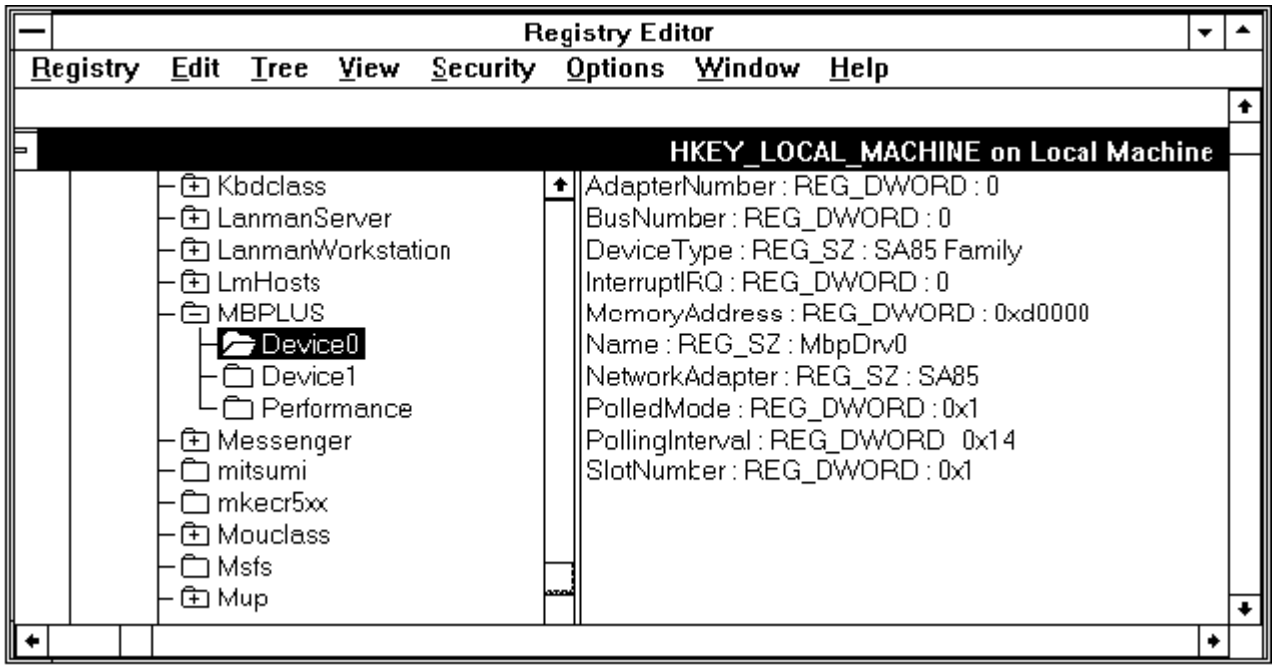
Once all entries have been made, select **OK** to process the configuration for the Adapter card.
Select **Done** in the "**Adapter Card Settings**" dialog box when Adapter card configuration has been performed.

When **Done** is selected the Server updates it's configuration file.

If Modicon **Local Netlib Library** drivers (not MBX!) are used to access the Modbus Plus network then the Server updates (if necessary) Adapter card's parameters in **REGISTRY** (Kernel Mode Device Driver settings). If it is necessary to reboot the computer to activate changes of Kernel Mode Device Driver settings then the message box appears with the following message: "**You must reboot to activate changes you made. Do you want to reboot now?** To restart the computer automatically, select **Yes**. If you want firstly to check the contents of Registry - select **No**, then check **REGISTRY** parameters and restart the computer manually.
***Note:** Not all parameter changes made in the "KLMBPLUS Adapter Card Settings " dialog box causes needs to restart the computer.*

Adapter Card Settings in Registry
All configuration information required for proper operation of the Modicon *Local NETLIB Library* is contained in the system Registry. The Registry is a system-wide database where MS Windows maintains systems hardware, software and user data.

You can access Registry information to view or to edit by using Registry editor or other software, which supports registry changing. (Usually Registry editor is started from C:\winnt\system32\regedt32.exe.)
Run regedt32.exe and select HKEY_LOCAL_MACHINE window.



Most of the configuration information used by the Kernel Mode Device Driver that is part of Local NETLIB Library is located directly under the HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\MBPLUS key in the Registry.

Each Adapter card has it's own subkey in the form of **Device0** or **Device1** and has it's own unique settings (subkey **Device0** strictly corresponds to Adapter number 0, subkey **Device1** - corresponds to Adapter number 1):

AdapterNumber
Each Adapter card must have a unique adapter card number assigned to it (0 or 1). Adapter Number corresponds to one you have selected in the "KLMBPLUS Adapter Card Settings" dialog box.

BusNumber
MS Windows supports systems with multiple buses. This parameter specifies the bus number for the Adapter card. Use default for this parameter (zero).

DeviceType
The device type identifies the adapter card family used with the library. For Modbus Plus host interface adapters select "SA85 Family".

InterruptIRQ
In case of KLMBPLUS operation an Adapter must run in *polled mode*. IRQ must be set to 0. The Interrupt IRQ jumper must be also set to polled mode on the Adapter card.

MemoryAddress
This parameter specifies the base address set by switches of the Adapter card (example: D0000). Memory Address corresponds to one you have selected in the "KLMBPLUS Adapter Card Settings" dialog box.

Name
This parameter is used to store the operating system visible name for the device driver (for example "MbpDrv0"). This name must uniquely identify the driver instance and cannot be used by any other driver in the system.

NetworkAdapter
This parameter identifies the type of Adapter card to be used. The valid name is: SA85.

PolledMode
In case of KLMBPLUS operation an Adapter must run in *polled mode*. Set parameter value to 1.

PollingInterval
This parameter specifies the polling interval in milliseconds that the driver will use when running in the polled mode. The valid range for the polling interval is 10 - 1000 milliseconds. The recommended value used is 20ms (default).

Slot Number
For all Micro Channel cards the slot number for the Adapter card has to be specified. The valid slot number starts from one.

Note: *Changes will be activated after the computer is rebooted.*

Adapter Card Settings without Administrator Privileges

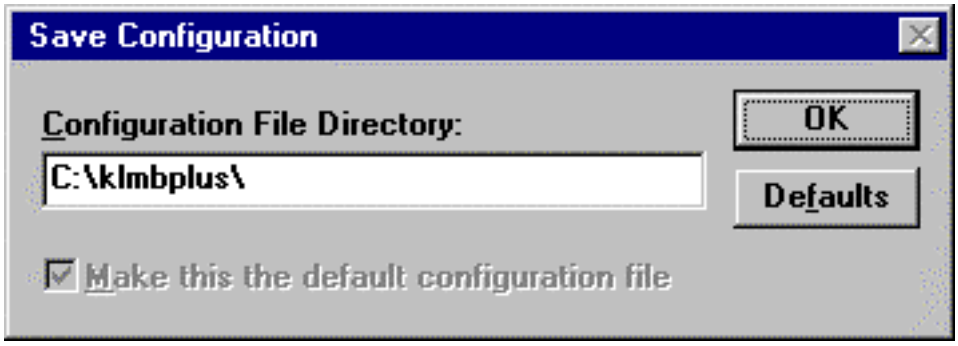
If you do **not** have privileges to change the Registry settings you can still use the Server with predefined *Kernel Mode Device Drivers* settings in Registry.

When opening the "KLMBPLUS Adapter Card Settings " dialog box (see chapter **Adapter Card Settings**) you can select **Adapter Number** and associate a new **Card Name** to it. You can configure the number of **Reserved Channels** as well as the **Reply Timeout** values.

Memory Base Address is *not accessible*! Value you see in this dialog field is not configuration value. Use Registry editor to check real Adapter settings in Registry.

Saving KLMBPLUS Configuration File

If a configuration file does not currently exist in the configuration file directory, the DDE Server will automatically display the Save Configuration dialog box.



This dialog box displays the path where the Server is going to save the current configuration file. The path may be changed if necessary. Also, the path can optionally be recorded in the **WIN.INI** file by selecting the **"Make this the default configuration file"** option. Doing so will allow the Server to find the KLMBPLUS configuration file automatically each time it is started.

Configuration File Location

When the KLMBPLUS Server starts up, it first attempts to locate its configuration file by, first checking the **WIN.INI** file for a path that was previously specified. If the path is not present in the **WIN.INI** file, the Server will assume that the current working directory is to be used.

To start the Server from an application directory configuration file other than the default configuration file a special switch **(/d:)** is used. For example, invoke the **File/Run** command from the **File Manager** or **Program Manager** and enter the following:

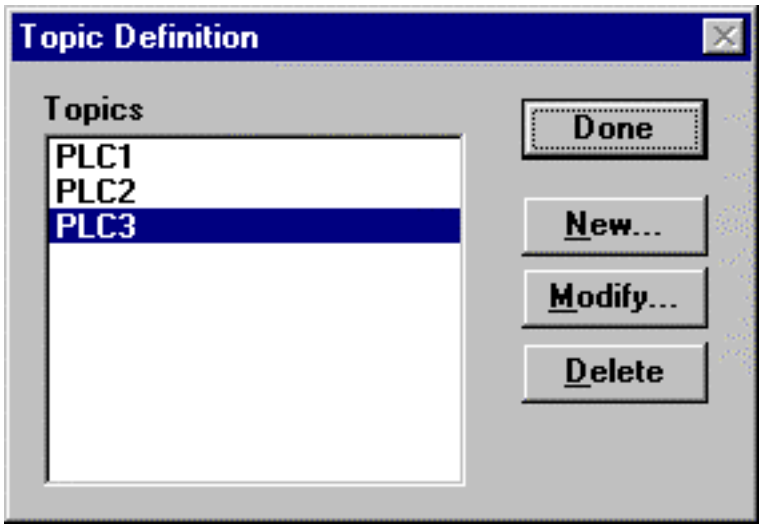
KLMBPLUS /d:c:\directoryname

Note: *There is no limit to the number of configuration files that may be created, although each must be in a separate directory.*

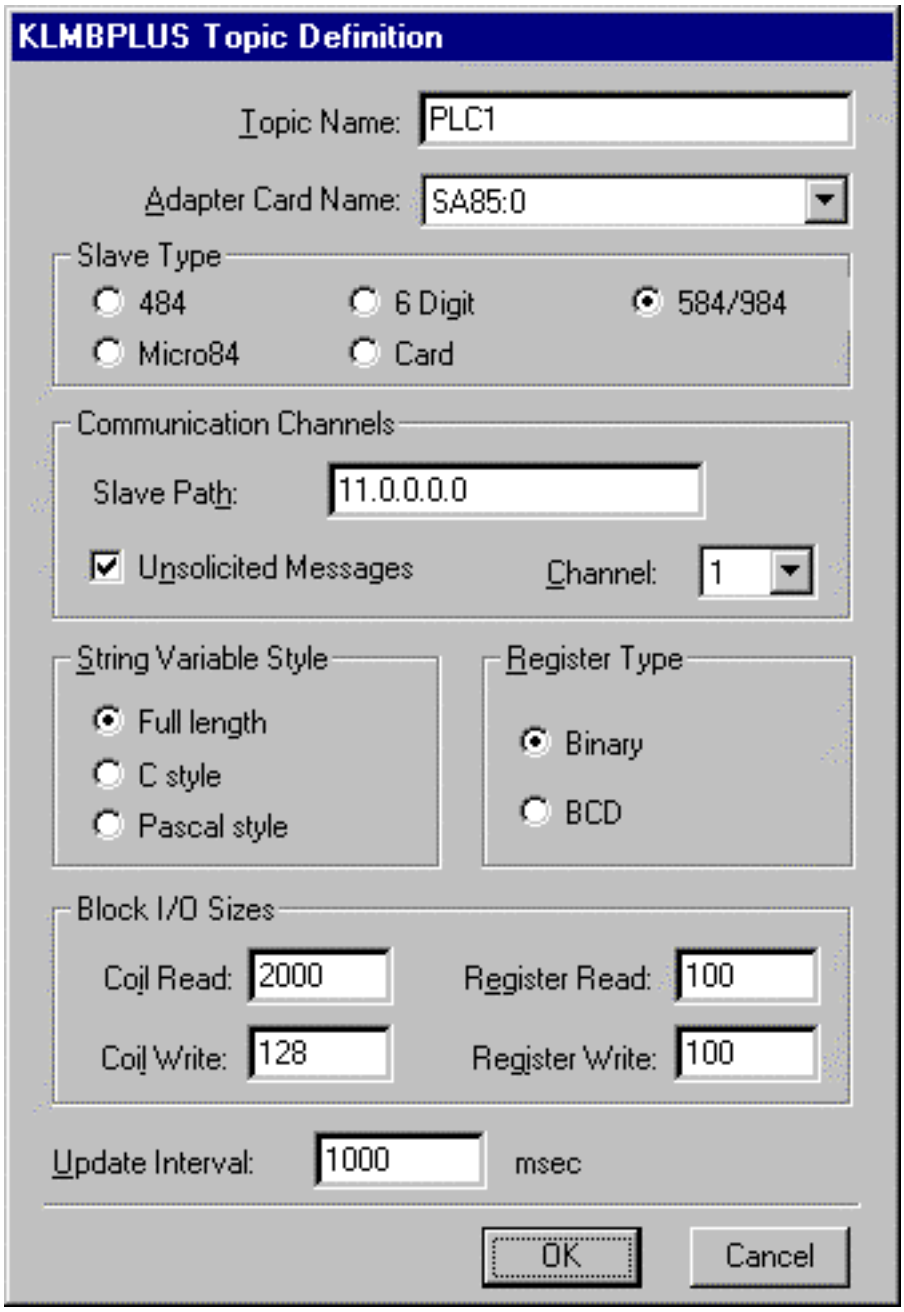
Topic Definition Command

The user provides each node with an arbitrary name which is used as the DDE topic for all references to the node.
The following steps are taken to define the topics (nodes) attached to the ***Mbplus*** network:

1. Invoke the **Topic Definition...** command. The "Topic Definition" dialog box will appear:



2. To modify an existing topic, select the topic name and click on **Modify**. To define a new topic, click on **New**. The " KLMBPLUS Topic Definition" dialog box will appear:



3. Enter the **Topic Name** which corresponds to the DDE Topic Name. (The DDE Topic Name is entered in the "DDE Access Name Definition" dialog box described in the chapter **Using the KLMBPLUS Server with InTouch**.)

4. Choose the **Adapter Card Name** to associate it with the topic. (Additional topics may be associated with the same Adapter Card Name at a later time.)
Note: *If this is the first time an Adapter Card has been configured, the user will be prompted to save it to an existing directory.*

5. Select the option for the **Slave Type** being used.

6. Enter the **Slave Path** of the PLC. If intermediate bridges are used between the PC and the PLC, enter the node IDs of the bridge(s) in order from the PC through all bridges, ending with the PLC. If multiple IDs are entered, they must be separated by a period (.).

7. Enable **Unsolicited Messages** to allow the Server to accept data which PLC internal program transfers to the host PC. In **Channel** box associate a Slave Channel number to listen for Unsolicited messages. This channel number must match the channel specified in the corresponding MSTR block (see chapter **Notes on Accessing Unsolicited Data**) in the internal program of the PLC wishing to transfer data to the host (PC).

Note: *If* ***Unsolicited Messages*** *is checked then the topic's Data execution depends on* ***Update Interval*** *value configured for current topic. If Update Interval value is zero then the Server is only looking for data sent by the PLC's internal program and no polling is processed. If the Update Interval value is non-zero, the Server polls for the data of this topic in addition to accepting Unsolicited messages.*
No data writes are processed for topics waiting for unsolicited data!
Note: *Never check* ***Unsolicited Messages*** *if the PLC internal program does not process Unsolicited Data, otherwise it hardly interrupts the Server data execution!*

8. Select the option for the style the PLC uses to store ASCII strings in its registers.
Note: *For more information on the String Variable Styles, refer to the chapter* ***Item/Point Naming****.*

9. Select the option for the **Register Type** being used.
Note: *This selection is relevant only for Register value transmission. If* ***BCD*** *option is checked then unsigned integers is executed as Binary Coded Decimal (BCD) values. Option is not relevant for signed integers, long integers, float values and strings, which are executed in similar way for each* ***Slave Type*** *selection.*

10. Enter the maximum number of consecutive coils to be read at one time. In this example, the valid **Coil Read** values can be between 8 and 2000 and must be an even multiple of 8. If this option is set to zero, then this operation is not available for the selected **Slave Type**.

11. Enter the maximum number of consecutive coils that can be written to at one time. In this example, the valid **Coil Write** values can be between 8 and 128 and must be an even multiple of 8. If this option is set to zero, then this operation is not available for the selected **Slave Type**.

12. Enter the maximum number of consecutive registers to be read at one time. In this example, the valid **Register Read** values can be between 1 and 100. If this option is set to zero, then this operation is not available for the selected **Slave Type**.

13. Enter the maximum number of consecutive coils that can be written to at one time. In this example, the valid **Register Write** values can be between 1 and 100. If this option is set to zero, then this operation is not available for the selected **Slave Type**.
Note: *The value represented in this example only applies to the* ***584/984 Slave Type.***

Note: *The default* ***Coil Read****,* ***Coil Write****,* ***Register Read*** *and* ***Register Write*** *values are maximally supported by the KLMBPLUS DDE Server. Reduce values if you suppose that number of data to be processed in one request is too great and the PLC cannot process such data quantity in satisfactory speed.*

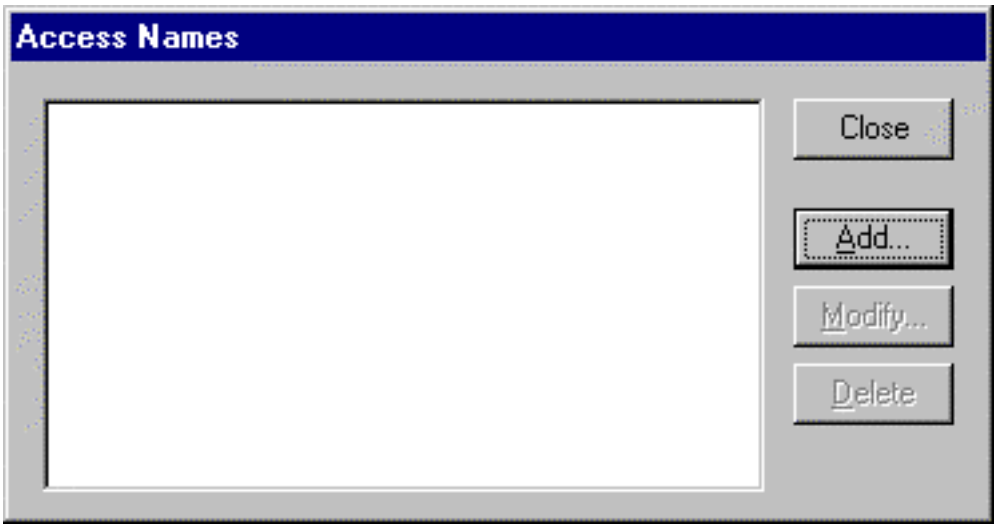
14. Enter the **frequency** (in milliseconds) that the Server will read (poll) the items/points associated with this topic. (Different items/points can be polled at different rates by defining multiple topic names for the same PLC and setting different updates rates for each topic.)

Once all entries have been made, click on **OK.**

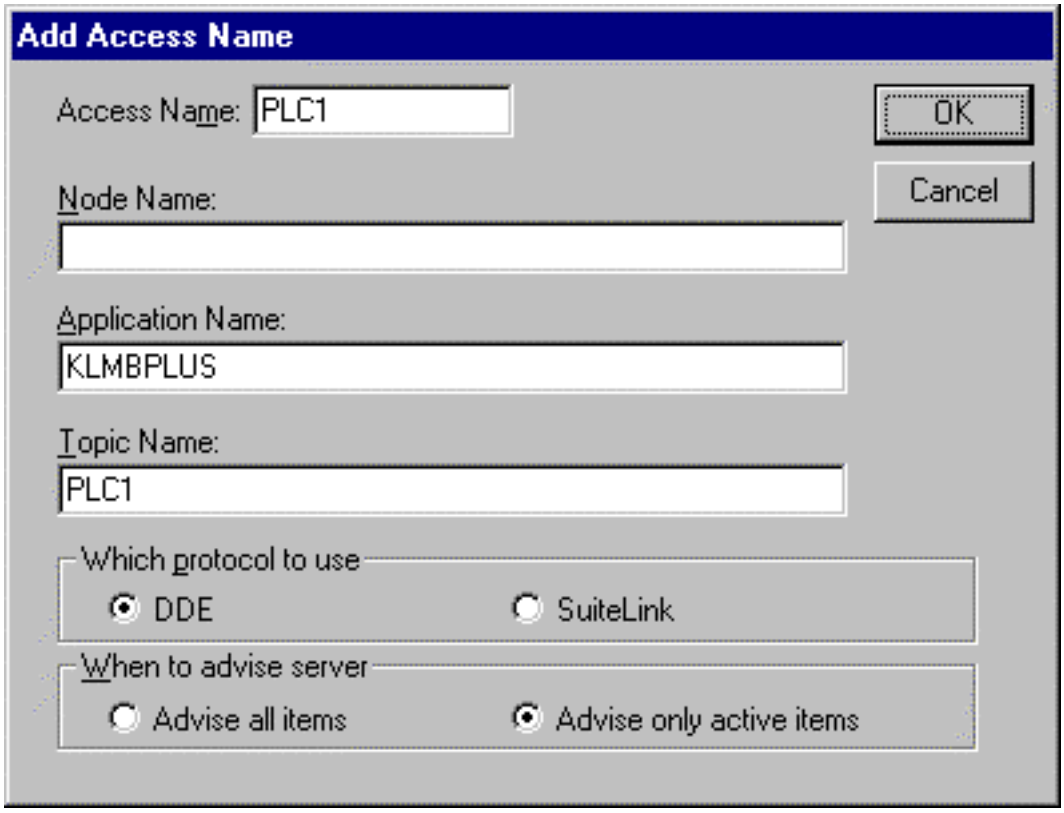
Using the KLMBPLUS Server with InTouch

To access items/points on Modicon PLCs from **InTouch**, the following steps (all performed in **WindowMaker**) are required:

To define the DDE Access Names in WindowMaker for each node invoke the */Special/Access Names...* command. The "Access Names" dialog box will appear.



Click on **Add**. The "Add Access Name" Dialog Box will appear:



***Note:** If **Add** is selected, this dialog box will be blank when it initially appears. Data has been entered here to illustrate the entries which are made.*

The following fields are required entries when entering a DDE Access Name Definition:

Access Name
In the Access Name box type the name you want InTouch to use to this Access Name. (For simplicity, use the same name that you will use for the Topic Name here.)

Node Name
If the data resides in a network DDE Server, in the Node Name box, type the remote node's name.

Application Name
Enter the application name, **KLMBPLUS**, which is the DDE Server used to accessing the Controller. Do not enter the .exe extension portion of the program name.

Topic Name
Enter the name defined for the topic in KLMBPLUS to identify the node the KLMBPLUS Server will be accessing.

Note: *This will usually be the same as the "Access Name", although, if desired, they may be different. However, it must be the same name used when the topics were configured in section* ***Configuring the KLMBPLUS Server.***

Which protocol to use
Select the DDE protocol.

When to advise server
Select **Advise all items** if you want the Server program to poll for all data whether or not it is in visible windows, alarmed, logged, trended or used in a script. Selecting this option will impact performance, therefore its use is not recommended.

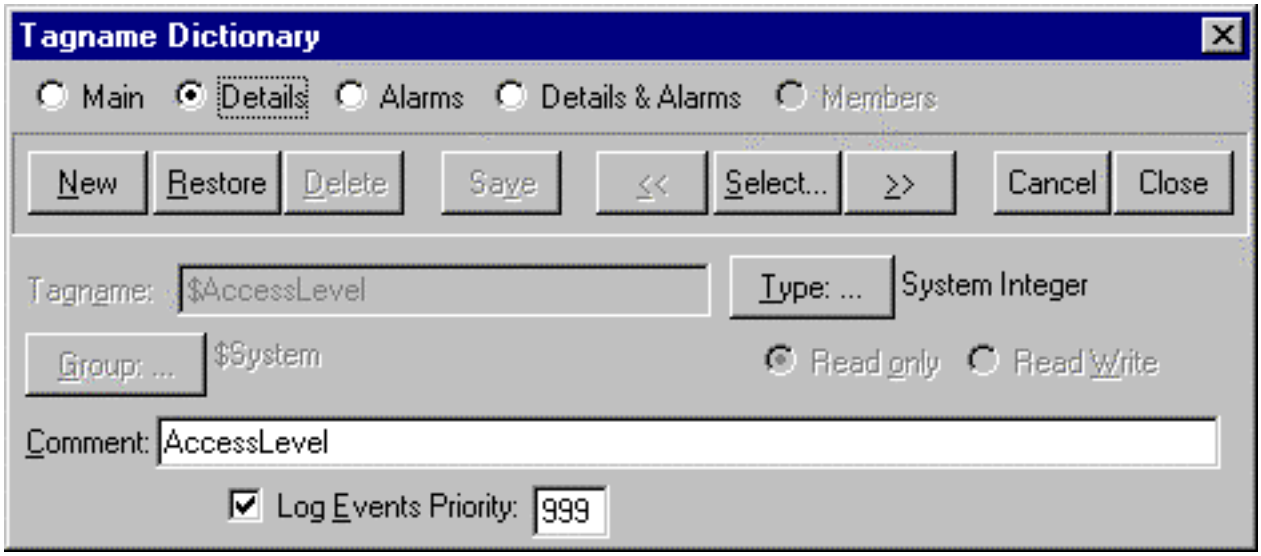
Select **Advise only active items** if you want the Server program to poll only points in visible windows and points that are alarmed, logged, trended or used in any script.

Click **OK** to accept the new Access Name and close the "Add Access Name" dialog box. The "Access Names" dialog box will reappear displaying the new Access Name selected in the list.

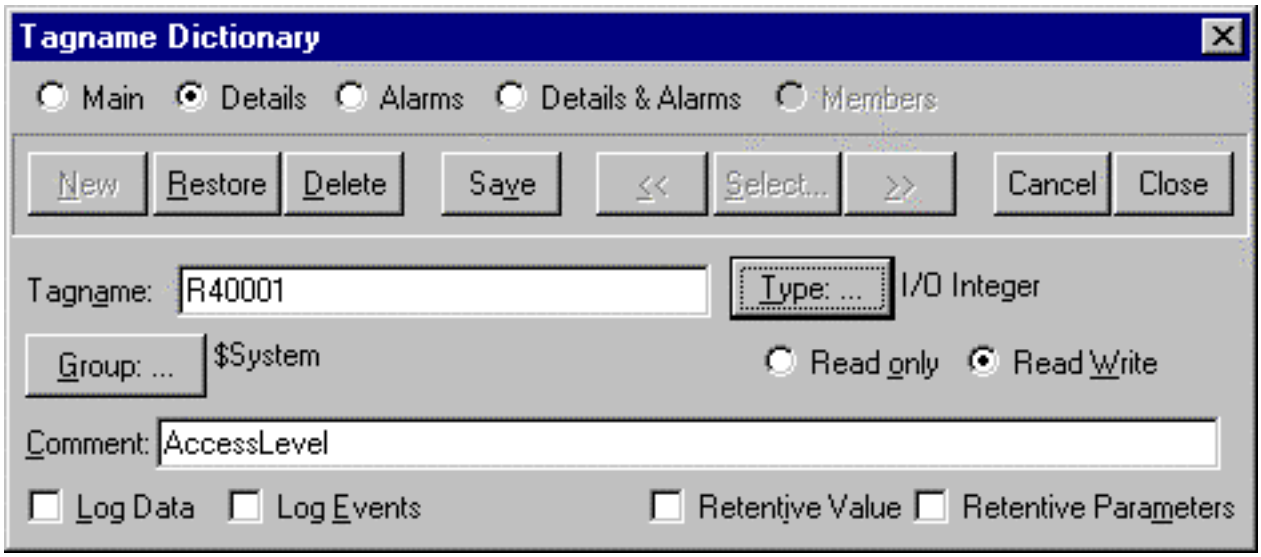
Click **Close** to close the "Access Names" dialog box.

Defining the Tag names

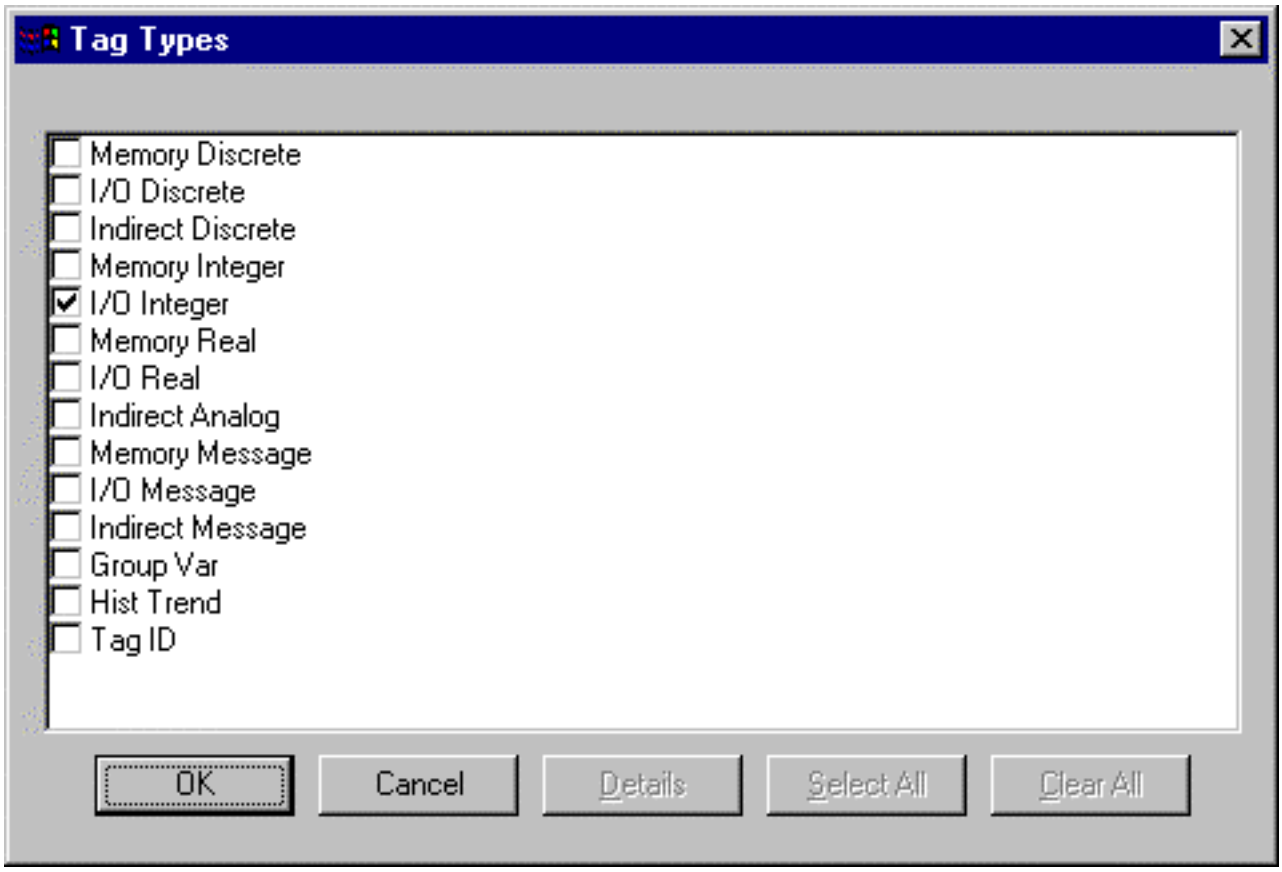
To define the Tag names associated with the new "Access Name", invoke the */Special/Tagname Dictionary...* command (in **WindowMaker**). The "Tagname Dictionary" dialog box will appear:



Click on **New** and enter the **Tag Name**. (The tag name defined here is the name **InTouch** will use. The KLMBPLUS Server does not see this name.)

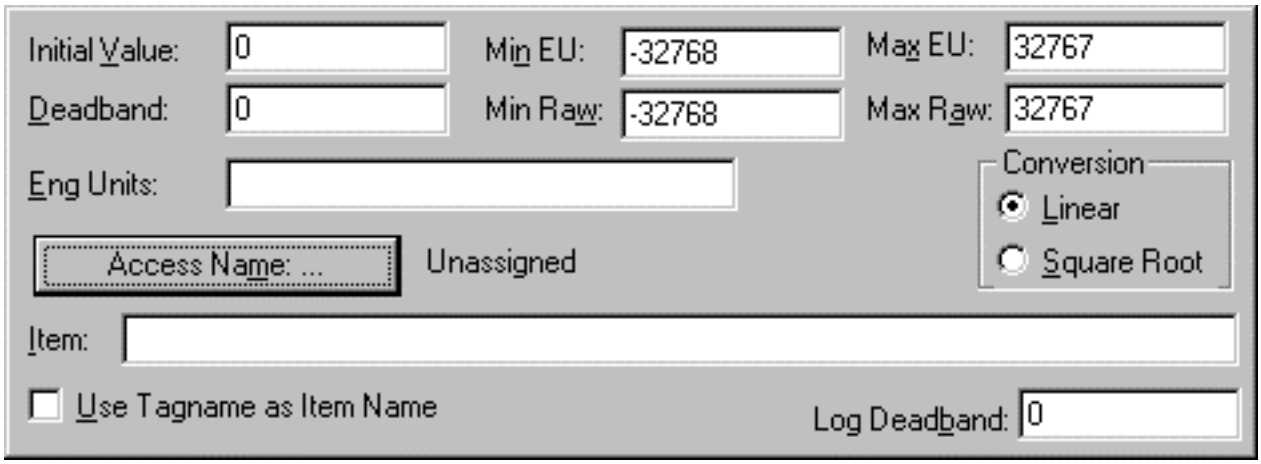


Select the tag type by clicking on the **Type** button. The "Tag Types" dialog box will appear:

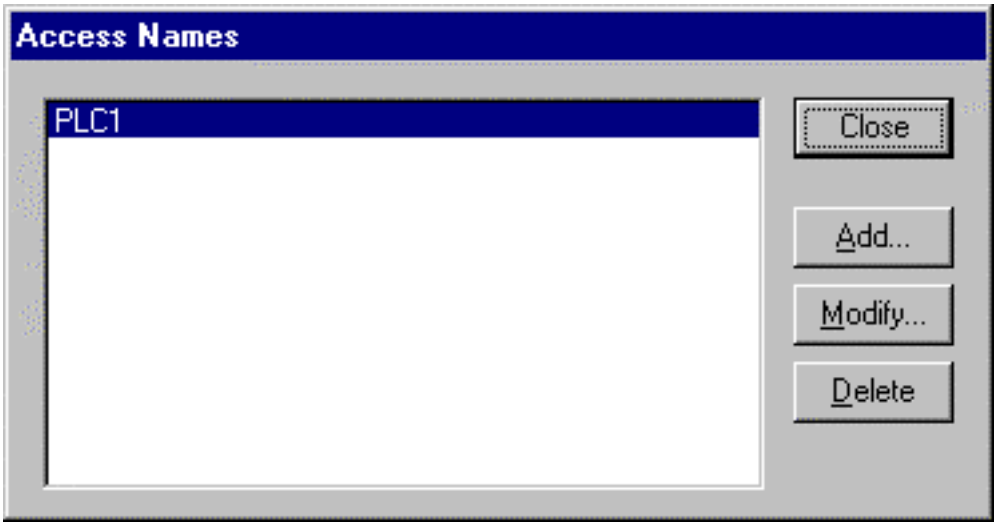


To access KLMBPLUS items, the type must be **I/O Discrete, I/O Integer**, **I/O Real** or **I/O Message**. Select the type.

The "Details" dialog box for the tag name will appear:

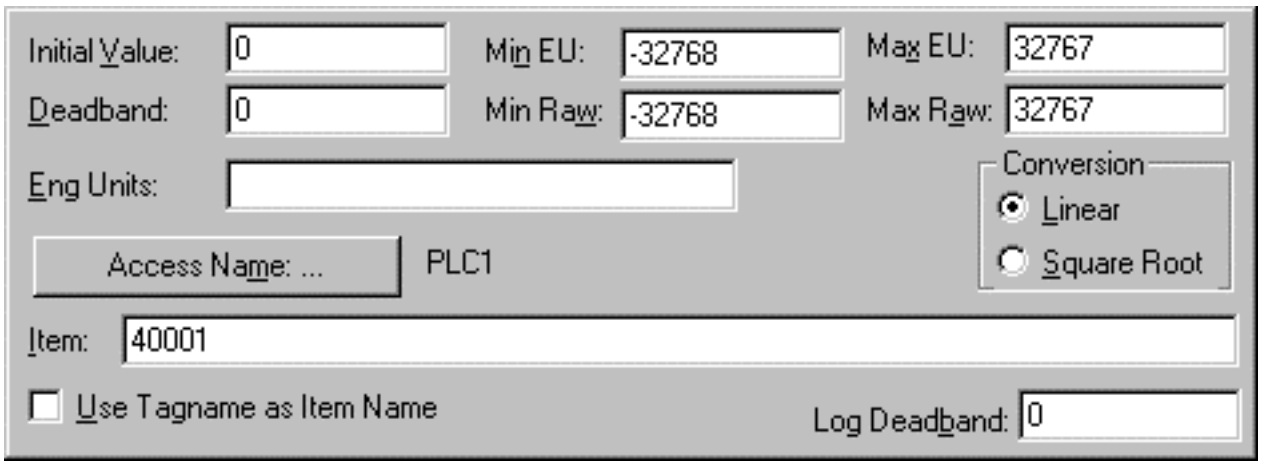


Select the KLMBPLUS topic (node) by clicking on the **Access Name**... button. The "Access Names" dialog box will appear:



Select the appropriate Access Name and click on **Close**. (If the Access Name has not been defined as previously described, click on **Add** and define the Access Name now.)

The "Details" dialog box will appear displaying the selected Access Name:



For integers and reals fill in the **Min EU**, **Max EU**, **Min Raw** and **Max Raw** fields. These fields control the range of values, which will be accepted from the server and how the values are scaled. If no scaling is desired, **Min EU** should be equal to **Min Raw** and **Max EU** equal to **Max Raw**.

Enter the KLMBPLUS item/point name to be associated with this tag name in the **Item** field in the "Details" dialog box:

(Refer to the **Item (Point) Naming** section below for complete details.)

Where applicable, the **Use Tag name as Item Name** option may be selected to automatically enter the tag name in this field. ***Note:*** *The tag name can only be used if it follows the conventions listed in the* ***Item (Point) Naming*** *section.*

Once all entries have been made, click on the **Save** button (in the top dialog box) to accept the new tag name. To define additional Tag names click on the **New** button. To return to the **WindowMaker** main screen, select **Done**.

Monitoring the Status of Communication with InTouch

InTouch supports built-in topic names called **DDEStatus** and **IOStatus**, which are used to monitor the status of communication between the Server and InTouch. For more information on the built-in topic names DDEStatus and IOStatus, see your online "InTouch Users Guide".

The status of communication between the Server and InTouch can be read into **Excel** by entering the following DDE reference formula in a cell on a spreadsheet (in following example PLC1 is the Topic Name configured for KLMBPLUS Server):

=view|DDEStatus!PLC1

Item (Point) Naming

The DDE Server supports item/point names that are consistent with the point naming convention used by Modicon PLCs. The Server allows you to select a Slave Type when you configure the topic definition for the PLC.

The **configuration** of the types **of data** can be as follows:

PLC Type	Point Type	Range	DDE Tag Type	Access
484	Coil	1-999	Discrete	Read/Write
	Contact	1001-1999	Discrete	Read Only
	Input Register	3001-3999	Analog	Read Only
	Holding Register	4001-4999	Analog	Read/Write
584/984	Coil	1-9999	Discrete	Read/Write
Micro84	Contact	10001-19999	Discrete	Read Only
	Input Register	30001-39999	Analog	Read Only
	Holding Register	40001-49999	Analog	Read/Write
6 Digit	Coil	1-655336	Discrete	Read/Write
	Contact	100001-165536	Discrete	Read Only
	Input Register	300001-365536	Analog	Read Only
	Holding Register	400001-465536	Analog	Read/write

Special handling of data from Modicon equipment can be done by using the following conventions:

SIGNED REGISTERS

The DDE Server normally allows register values in the range of 0 to 65535. Registers may be treated as 16-bit signed quantities having values from -32,768 to 32,767.
To specify that a register be treated as a signed quantity, append a space and the letter **S** to the item name. For example, to indicate that the first Holding Register is signed, enter "40001 S" for the item name.

LONG INTEGERS

Pairs of registers can be treated as 32-bit signed integers. This is done by appending a space and the letter **L** to the item name. For example: 40001 L.

FLOATING POINT

Pairs of registers can be treated as IEEE 32-bit floating-point numbers. This is done by appending a space and the letter **F** to the item name. For example: 40001 F.

BITS IN REGISTERS

Individual bits in registers can be read as discrete tags by using the notation **rrrr:b**.
Where **rrrr** specifies a valid input register or holding register and **b** specifies a bit position between 1 and 16 (1 specifies the most significant bit of the register).
Examples:

40001:1 most significant bit of first holding register
30008:16 least significant bit of an input register
4001:5 5th from the most significant bit of first holding register in a 484 controller.

Note: *Bits in registers are read-only. The Modbus/Modbus Plus protocol has no commands to write individual register bits.*
Since version v1.05 the Server supports bits in Global area (except Global area of topic corresponding to the network adapter card.)

EXPLICIT CONVERSIONS
Coils and contacts are treated **only** as discrete variables.

Registers are normally treated as integers. This can be altered for specific registers by adding a blank space (using the spacebar) and one of the following to the point type:

- **L** Long
- **F** Float
- **M** Message (ASCII Strings)

MODULO-10000 POINTS
Two or three consecutive registers may be interpreted as a single numeric quantity. In doing so, each of the component registers must be in the range of 0-9999. For example, two registers "**40001-40002**" can represent numbers between 0 and 99999999. Overflow becomes a possibility when grouping three consecutive registers for interpretation as a single numeric quantity. The largest number that may be represented in the PLC with three consecutive Modulo-10000 registers is 999,999,999,999. Unfortunately, the largest number, which can be contained in 'integer' type variable, is 2,147,483,647. The latter number is used by the Server to represent an overflow condition. Therefore, the maximum usable value represented in three Modulo-10000 registers is 2,147,483,646 (or < 21 >< 4748 >< 3646 >). Any numbers larger than this will be clamped at 2,147,483,647.

ASCII STRINGS
Multiple consecutive registers (1-100) can be treated as a string of ASCII characters. The first character of the string is in the high-order 8-bits of the lowest numbered register. Three options are provided for the representation of variable length strings:

1. The string may be padded with ASCII spaces (hex 20) - (**FULL LENGTH**).
2. The string may be terminated with a zero byte - (**C-STYLE**).
3. The length may be stored in the first byte - (**PASCAL STYLE**).

Strings of ASCII characters can be stored in consecutive registers in a PLC. The number of registers that are allocated to the storage of an individual string must be fixed. However, the string contained in those registers can have a variable length up to twice the number of registers allocated. Strings are stored in Modbus/Modbus Plus registers from lowest numbered register to the highest and within each register, first the most significant byte, then the least significant byte. The Modbus/Modbus Plus DDE Server supports three methods of storing strings of ASCII characters in registers:

FULL LENGTH
If strings are stored in this manner, the string always uses all of the registers allocated. If the string is shorter than the allocation of registers, it is padded with ASCII space

characters (hex 20) to the full length. For example, string item "30001-30010 M" containing the ASCII string "Wonderware":

	MSB	**LSB**	
30001	57	6F	"Wo"
30002	6E	64	"nd"
30003	65	72	"er"
30004	77	61	"wa"
30005	72	65	"re"
30006	20	20	" "
30007	20	20	" "
30008	20	20	" " padded to the end
30009	20	20	" " with ASCII spaces
30010	20	20	" "

C-STYLE
If strings are stored in this manner, the end of the string is marked by a byte of zero immediately following the last character in the string. This option is so named because this is the way strings are stored in the "C" programming language. For example, string item "30001-30010 M" containing the ASCII string "Wonderware":

	MSB	**LSB**	
30001	57	6F	"Wo"
30002	6E	64	"nd"
30003	65	72	"er"
30004	77	61	"wa"
30005	72	65	"re"
30006	0	x	end marked by zero
30007	x	x	the remaining
30008	x	x	bytes
30009	x	x	are
30010	x	x	unused

PASCAL STYLE
If strings are stored in this manner, the length of the string is denoted by a length byte which occupies the first byte of the string (MSB of the first register). This option is so named because this is the way strings are stored in the "Pascal" programming language (for most compilers). For example: string item "30001-30010 M" containing the ASCII string "Wonderware":

	MSB	**LSB**	
30001	10	57	length = 10"W"
30002	6F	6E	"on"
30003	64	77	"de"
30004	72	72	"rw'
30005	61	x	"ar"
30006	65	x	"e"
30007	x	x	the remaining
30008	x	x	bytes
30009	x	x	are
30010	x	x	unused

ABSOLUTE NOTATION
Absolute item naming conventions are available that are independent of PLC model numbers. The absolute notation allows accessing of the four Modbus/Modbus Plus data types, each with an address from 0 to 65535. The item name suffix characters indicate the data types as follows:

nnnnn **DO** (Discrete Output) refers to the same data Modbus/Modbus Plus calls "coils" (valid range is 0 **DO** through 65535 **DO**.)

nnnnn **DI** (Discrete Input) refers to the same data Modbus/Modbus Plus calls "contacts" (valid range is 0 **DI** through 65535 **DI**.)

nnnnn **IR** (Input Registers) refers to the same data Modbus/Modbus Plus calls "input registers" (valid range is 0 **IR** through 65535 **IR**.)

nnnnn **HR** (Holding Registers) refers to the same data Modbus/Modbus Plus calls "holding registers" (valid range is 0 **HR** through 65535 **HR**.)

nnnnn **PV** (Process Variable) refers to holding registers but treats them as floating points and assumes 2 registers per floating point number. The valid range is 0 **PV** through 32767 **PV.**

The **IR** and **HR** absolute notations can also be combined with the following conversions: **L** (long), **F** (floating point) **or S** (signed.) For example:

219 HRS 16 bit signed integer
0 IRL 32 bit signed integer
100 HRF 32 bit floating point

GLOBAL DATA
Global Data tags are specified with a **G** suffix. For example, point "10 G" refers to the 10'th register in the global area for the topic. Valid address range is from 1 G to 32 G. You can use the G in conjunction with the other data type suffixes. For example, "10 GF" is acceptable, and specifies that registers 10 and 11 in the global data area are to be taken together as a floating-point value. This is analogous to the way the tag "40001 F" specifies registers 40001 and 40002 will be taken together as a floating-point value.
Note: *Global data is read from the Modbus Plus "token" rather than via direct communication with the PLC. The PLC places its global data in the token, then passed the data amongst all the participants in the network. This data stays in the token even after a PLC leaves the network. Topics which read global data exclusively from the PLC (i.e. there are no tags on advise which cause the Server to poll the PLC for data) will never show STATUS failing, even if the PLC leaves the network. It is recommended to place at least 1 "keep-alive" tag on advise to prevent this from occurring.*

The MBPLUS Server cannot write to the global data of PLCs, and POKEs to global data tags are not allowed.

For detailed explanation of Global data processing see chapter **Notes on Accessing Global Data**.

UNSOLICITED DATA
Unsolicited Data has no special point naming conventions. However, due to the architecture of the Modicon PLC's, only 4xxxx tags (or 4xxxxx tags in the 6-digit models) may be written to with unsolicited messages.
For detailed explanation of Unsolicited data processing see chapter **Notes on Accessing Unsolicited Data**.

Special write-only DDE Discrete Item **SUSPEND** may be used to control communication with a separate topic. If application changes Item's value from 0 to 1 - then communication with topic is suspended. If Item's **SUSPEND** value is changed back to 0, communication with topic is resumed.
Note*: When topic is suspended by setting* ***SUSPEND*** *item to 1, the Server rejects all write values to this topic.*

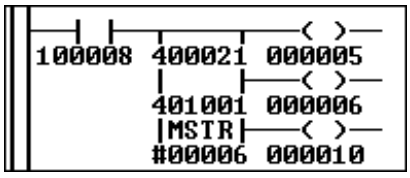
Notes on Accessing Global Data

The PLC places its Global data in the token, and then passes the data amongst all the participants in the network. This data stays in the token even after a PLC leaves the network. Server can read PLC's Global data if topic with PLC address (slave path) is activated. Global data can be accessed in local network.

Reading GLOBAL DATA by the Server

To read values from PLC's Global data a topic associated to the PLC should be activated. To do it check PLC type in option **Slave Type** (e.g. 584/984). Do not select Card that corresponds to Adapter card. Set **Slave Path** of PLC, e.g. 11.0.0.0.0.
Note: *A general slave topic is useful for PLC's Global data access.*

The PLC Internal program must contain **MSTR** (Master Instruction Block) functions for Global data writing like presented in Ladder diagram below.



MSTR for Global data writing is represented in example with 3 parameters:

Top Parameter

Top Parameter (Register 400021 - in example) identifies the start address of contiguous Holding register area containing 5 registers that comprises the **Control Block.**

Middle Parameter

The register 401001 entered in the middle Parameter is the first in a group of contiguous holding registers that comprise the **data area.** For operations that supply data to the communication processor-such as a Write operation-the **Data area** is the source of the data.

Bottom Parameter

The integer value entered in the bottom parameter (direct constant value 00006 - in example) specifies the length - i.e., the maximum number of registers in the **Data area.** The **Length** must be in the 1...32 range.

Note: *Coils and Contact presented in Ladder diagram example are used for MSTR processing control.*

Control Block example description
The registers in the MSTR **Control Block** contain the following information for Global data **Write** operation:

Register*	Function	Contents**
Displayed (400021)	Operation type	5 - identifies MSTR Operation types (Write=5)
400022	Error status	0 - Displays a hex value indicating an MSTR error when relevant
400023	Length	6 - Specifies the number of registers from the data area to be sent to the comm processor. The value of the Length must be ≤32 and must not exceed the size of the data area.
400024	N/A	0
400025	Routing 1	0 - If this is the second of two local nodes set the high byte value to 1.

*) Presented Register Addresses are given for example.
**) Presented values are ready to work example for Global data writing MSTR.

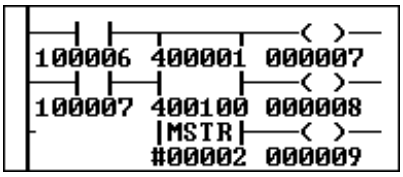
For more detailed explanation of this question see manuals for **MODSOFT** - Modicon PLC's programming software.

PLC can write to global buffer ≤32 words from it's Holding register area. To access these data a topic associated to a PLC must be activated in the Server and Items 0 G ... 31 G should be polled.
If PLC internal program is running the MSTR like in presented example then Items 0 G ... 5 G are accessible. Item's 0 G value corresponds to Holding register 401001 (MSTR Middle Parameter) value in the PLC memory, 1 G value corresponds to Holding register 401002 value, etc.

Notes on Accessing Unsolicited Data

Note: *Option is not supported with MBX drivers.*
Due to the architecture of the KLMBPLUS PLC 4xxxx tags (or 4xxxxx tags in the 6 digit models) may be transferred to the PC's Adapter card node by the PLC internal program. Such data is interpreted by the KLMBPLUS Server as UNSOLICITED data. When processing Unsolicited data the PLC is the **master** and Server is the **slave.** In case of KLMBPLUS Server such data can only be transferred from PLC to the PC but cannot be requested by PLC from the PC (Server). It means that the Server only accepts data writing commands sent by the PLC internal program and extracts data values from these commands. The Server rejects all data request commands.

To process Unsolicited Data the PLC internal program must contain **MSTR** (Master Instruction Block) function to transfer Holding register contents from PLC to the Adapter Card's node. The following **Ladder diagram** contains an example of such MSTR.



MSTR for data transfer is represented in example with 3 parameters:

Top Parameter
Top Parameter (Register 400001 - in example) identifies the start address of contiguous Holding register area containing 9 registers that comprises the **Control Block.**

Middle Parameter
The register 400100 entered in the middle Parameter is the first in a group of contiguous Holding registers that comprise the source **data area** to be transferred to Adapter card's node.

Bottom Parameter
The integer value entered in the bottom parameter (direct constant value 00002 - in example) specifies the length - i.e., the maximum number of registers in the **Data area.** The **Length** must be in the 1... 100 range.

Note: *Coils and Contact presented in Ladder diagram example are used for MSTR processing control. It is recommended to activate MSTR processing in PLC program for alarm information as well as for transferring data what needs fast update rate.*

Control Block example description
The registers in the MSTR **Control Block** contain the following information:

Register*	Function	Contents**
Displayed (400001)	Operation type	1 - identifies MSTR Operation types (Write=1). (Read is **not applicable** for KLMBPLUS Server operation! The Server will reject PLC's requests for data.)
400002	Error status	0 - Displays a hex value indicating an MSTR error when relevant
400003	Length	2 - Specifies the number of registers to be transferred to the Adapter card's node. The value of the Length must be 1...100.
400004	Slave device memory area	100 - Specifies starting 4x register in the slave to be read from or written to (e.g. 100=400100, 101=400101)
400005... 400009	Routing 1...5	**4 1 0 0 0** - Designates the first...fifth routing path addresses. In example - value **4** in register 400005 is **Adapter card network Address**, value **1** in register 400006 is **Slave channel number** opened in the Server (see "KLMBPLUS Topic Definition" dialog box).

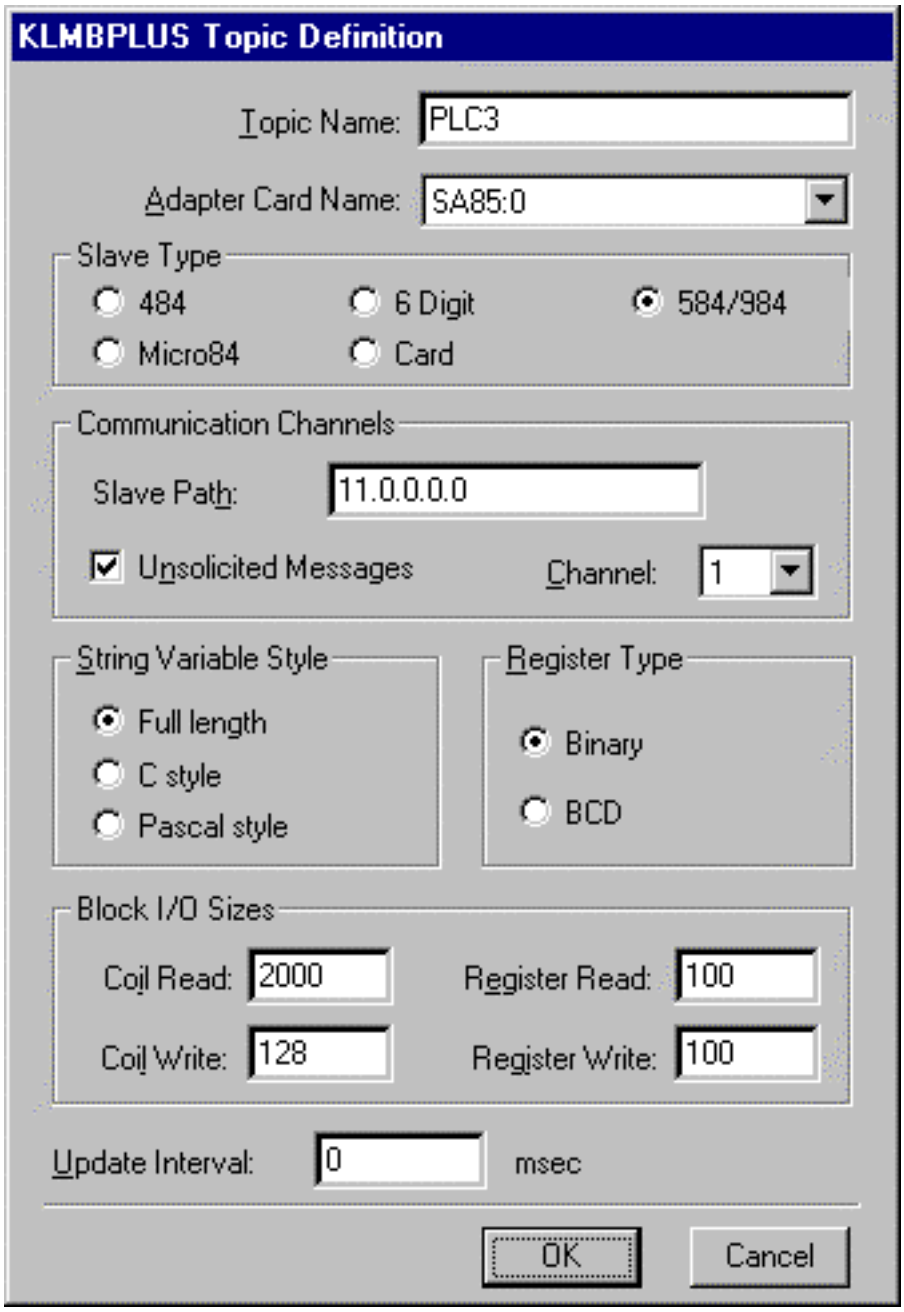
*) Presented Register Addresses are given for example.
**) Presented values are ready to work example of MSTR for Unsolicited data transferring.

In this case PLC Internal program is going to transfer 2 consecutive Holding register values (starting from 400100) to the PC's Adapter Card with network address 4. Data is accessible by the Server through Data Slave channel #1.

For more detailed explanation of this question see manuals for **MODSOFT** - Modicon PLC's programming software.

It is **not** recommended to activate more than 8 topics supporting Unsolicited data for one Adapter card. Otherwise two or more topics will be addressed to the same Data Slave channel number and that will lead to data interlinking.

To configure the topic processing unsolicited data do the following:
enable **Unsolicited Messages** check box to allow the Server to accept and process Unsolicited data,
choose the **Channel** number the Server is going to listen to for Unsolicited messages. This channel must match the channel specified in the corresponding MSTR block of the PLC wishing to transmit Unsolicited data to the Server.



If the **Update Interval** value in "KLMBPLUS Topic Definition" dialog box is non-zero, the Server will poll for the data in this topic (using standard Data access principles) in addition to accepting unsolicited messages.

To get values of Unsolicited data a client application must activate corresponding Items (in example presented in this chapter - Items 40100 and 40101). The Server updates values of these Items each time when Unsolicited data are received.

Note: *After Unsolicited Item is activated by an application the Server immediately reeds value of an Item through Data Master channels and further waits for Unsolicited messages.*

***Note:** It is **not** recommended to create more than 8 topics per Adapter card supporting unsolicited data otherwise two or more topics will be addressed with the same Data Slave channel number (1...8) and that will lead to data interlinking. The Server does **not denied** creation of such topics!*

Notes on Improving DDE Server Performance

1. Choosing data access mode.
If the information gathering speed is of essence, for instance Alarms, then a separate topic associated to the PLC must be created and only few frequently updated Items should be activated in this topic. Update Interval must be configured to small value.
In this case also the Unsolicited data execution mode may be used instead of standard data polling mode (see chapter **Notes on Accessing Unsolicited Data**). If the Server process Unsolicited data then such data must be transferred by the PLC internal program so frequently that the Server receives data each time when it looks for Unsolicited Data. If no Unsolicited Data received then the Server is waiting for them half a second before leaves a code. It hardly interrupts the Server execution. For this reason not only Alarm information (when Alarm happens) must be transferred by the PLC internal program but also "non-Alarm" information must be send time-by-time if no Alarm happens.
If a topic is created to process Unsolicited data then an additional topic must be created (without Unsolicited Messages support) with the same PLC address and all data writing must be processed through this topic.

If data access speed has no great importance then standard data polling mode should be used.

2 The timing problems
The combination of two timing values ("Protocol Timer Tick " value from "DDE Server Settings" dialog box and "Update Interval" value from "KLMBPLUS Topic Definition" dialog box) and total number of send messages for each topic determine the performance of the Server.
In all cases number of messages sent to the network multiplied by "Protocol Timer Tick" and divided by Channel number the Server operates with (configured in "KLMBPLUS Adapter Cards Settings" dialog box) must fit into "Update Interval" for all topics. For example, if there are two topics with 5 messages in one topic and 6 messages in second, "Update Interval" for both topics is 1000 milliseconds and "Protocol Timer Tick" is 50 milliseconds then total Server work time is
50 * 5 + 50 * 6 = 250 + 300 = 550 milliseconds when accessing data through one channel. If channel number to operate is 5 (if Reserved Channels number configured in "KLMBPLUS Adapter Cards Settings" dialog box is 3) then total Server work time is 550 / 5 = 110 milliseconds. In this case if total amount of information sent/received to/from the MBPLUS network is great and also processing of received data is time consuming then there would be heavy conditions for other Windows applications (no time to work between each 50 milliseconds).

For a great InTouch applications (with 500 items and more) it is recommended to increase "Protocol Timer Tick" value and "Update Interval" value - this will allow other Windows applications run at better timing conditions.

3 Using MBPLUS Network Resources

The KLMBPLUS Server supports access up to 64 data areas in Global buffer and supports processing of up to 8 Data Master channels and up to 8 Data Slave channels (for Unsolicited messages) for each Adapter card installed on the PC.
When the Server enters the code it tries to execute maximum number of data channels per scan and that might put other Windows applications into heavy timing conditions. To achieve better system timing conditions it is recommended to configure a number of processed topics/messages per scan. To do it you must set the following Items in WIN.INI file:
[KLMBPLUS]
MaxUnsolicInTimerTick=5
MaxGlobalInTimerTick=1
MaxChannelInTimerTick=2
If you enter a values as shown in example then every time the Server enters a code it checks **5** Slave channels for Unsolicited data, then process Global data for **1** PLC and then process data through **2** Data Master channels. If application has created many topics then each of Data Master channels is used for a separate topic execution. If only one topic is created then both channels are used for simultaneously accessing that topic data.
By manipulating with MaxUnsolicInTimerTic, MaxGlobalInTimerTic and MaxChannelInTimerTic values optimal KLMBPLUS Server performance can be achieved. Each system configuration must have unique settings. To access data in local network it is not reasonably to activate many channels. When data is accessed from remote networks then the more channels are activated the best timing conditions may be achieved.
If WIN.INI file does not contain these entries then the Server operates with the default values:
MaxUnsolicInTimerTic=4
MaxGlobalInTimerTic=1
MaxChannelInTimerTic=8.

4 The using of PLC memory areas

In most cases the KLMBPLUS DDE Server uses MODBUS commands to process data in MBPLUS network and the maximum number of data items received from the network is defined by user in the "KLMBPLUS Topic Definition" dialog box.
For example, **Register Read Item** value is set to 100. In this case maximum of 100 words can be read by one command. The Server uses the following system to create read commands: memory area's words 0-99 read by the first command, words 100...199 in the second, etc. The data only from one memory area can be read by one read command. In this case the optimal using of PLC memory is very important - there must be as few as possible commands sent to the network and it is strongly recommended to use consecutive memory addresses for DDE items/points - this will considerably improve the performance of the Server. This choice is recommended if large amount of consecutive data must be read from few memory areas.

5. Other proposals
For great InTouch applications it is recommended to decrease the amount of log information used for historical trending - historical trends are stored on the disk and therefore disk read/write operations will take more time as permissible. If there are problems with the speed of screen redrawing then possible solutions would be the decreasing of total amount of redrawn information (specially texts) or the increasing of Server timing values "Protocol Timer Tick" and "Update Interval".
It is recommended to check **DumpScreen** option in the Server's System Menu (see chapter **Troubleshooting**) only for testing of Server's execution, not in case of normal Server's execution.

Notes on Using Microsoft Excel

Data from KLMBPLUS topics (nodes) may be accessed from Excel spreadsheets. To do so, enter a formula like the following one into a cell on the spreadsheet.

=KLMBPLUS|topic!item

Sometimes, Excel requires the topic and/or item/points to be surrounded by apostrophes.

In the formula, **topic** must be replaced with one of the valid topic names defined during the Server configuration process. Replace **item** with one of the valid item/point names described in the **Item (Point) Naming** chapter.

Reading Values into Excel Spreadsheets

Values may be read directly into Excel spreadsheets by entering a DDE formatted formula into a cell, as shown in the following examples:

=KLMBPLUS|'PLC1'!'40001'
=KLMBPLUS|'PLC2'!'10 G'
=KLMBPLUS|'PLC3'!'21 IR'

Writing Values to KLMBPLUS Points

Values may be written to the **KLMBPLUS** Server by creating an Excel macro which uses the DDE **"POKE"** Command. The command is entered in Excel as follows:

=INITIATE("KLMBPLUS ","Topic Name")
=POKE(Channel_Id,"Item",Data_Reference)
=RETURN()

For Channel_Id, use the cell reference where the **"INITIATE**" statement is found.
For Data_Reference, use the cell identification, which contains the **"POKE"** value.
Some applications have a limited number of channels; therefore, they should be closed when finished by using a **"TERMINATE"** statement in the macro. The **"TERMINATE"** macro should have sufficient delay to ensure that the **"POKE"** has been executed. (Refer to the Excel Manual for further details.)

Improving Excel/DDE Server Performance

To improve communication performance between Excel and the DDE Server, the following lines should be added to the **WIN.INI** file under the DDE Server heading:

AllowXLTable=1
DDE Server will accept XLTable format initializations from Excel. This will significantly speed up the initialization of Excel/Server Conversation.

AllowXLTableForPokes=1
DDE Server will accept XLTable format pokes from Excel. This will significantly speed up the poke operations from Excel.

For example: **[KLMBPLUS]**
AllowXLTable=1
AllowXLTableForPokes=1

Troubleshooting

WIN.INI entries

The first time you run the KLMBPLUS DDE Server configuration, most of the items in the following list will automatically appear in the WIN.INI file. It is usually in the C:\WINDOWS directory. It is an ASCII file and can be altered manually if you wish with any text editor, e.g., MS Windows
Note: *do not use a program that formats text, such as MS Word or Write unless the file is saved as a DOS text).*
The following is a typical entry for the KLMBPLUS DDE Server:

[KLMBPLUS]
ProtocolTimer=50
RequestTimer=1000
ValidDataTimeout=60000
DDEBlockSize=4096
WriteRetryIndefinitely=0
ConfigurationFile=C:\KLMBPLUS
MaxUnsoliInTimerTic=4
MaxGlobalInTimerTic=8
MaxChannelInTimerTic=1
WinIconic=0
WinFullScreen=0
WinTop=112
WinLeft=0
WinWidth=200
WinHeight=168
ShowEvents=1
ShowSend=0
ShowReceive=0
ShowErrors=1
MultiWrite=0
SlowPollRetries=2

SlowPollInterval=15
ShowAllRejectedWrites=0
ConsecutiveWriteErrors=3
MaxUnsolicInTimerTick=5
MaxGlobalInTimerTick=1
MaxChannelInTimerTick=2

The **MultiWrite** entry is used to enter the data writing principles for the Server. The following values can be entered.

(1) If **MultiWrite=0** then for each new write value a separate write message is created. Only one write message is executed per scan. Even if more than one Network data channel is accessible only one channel will be used to process write message when the Server enters a code. The Server changes the values in the PLCs in the same sequence as they are changed in the user (client) application. In this case the data update rate is low if application changes values very frequently.

(2) If **MultiWrite=1** then the same message can be used for the writing of new values into the consecutive memory addresses for the same memory area (for example, into 40001, 40002, 40003...). Up to 128 consecutive values can be included in the same write command depending on configured Block I/O Sizes (**Coil Write** and **Register Write**) in the "KLMBPLUS Topic Definition" dialog box (see chapter **Topic Definition Command**). The new value can be added only to the end of the last write message (last message in the list of pending write messages). Therefore some values may be written into the PLC memory simultaneously even if the client application changes them step-by-step. In this case the writing speed can be seriously increased. If more than one Data channel is accessible the Server process more than one write command simultaneously.

For example, the client application sequentially changes the values of following 100 items: 40001, 40002,..., 40100 and the values of following 100 items: 00001, 00002,..., 00100. In this case the Server creates only two write messages to write the new values for all the changed items. If the values of the same Items are changed in the following sequence: 40001, 00001, 40002, 00002, 40003, ... then Server creates a separate write message for the each new write value.

(3) If **MultiWrite=2** then Server tries to include the new write value into the some of previously created messages ignoring the sequence of data changing in the client application. If more than one Data channel is accessible the Server process more than one write command simultaneously. **Important!** *If MultiWrite=2 then maximum writing speed is achieved, but this option* ***is not recommended*** *if data changing sequence is important for PLC program!*

The **ConsecutiveWriteErrors** entry is used to enter the number of consecutive unsuccessful write retries for one write command. If after **ConsecutiveWriteErrors** the write command still is not executed then write command is deleted from the list of active (pending) write messages and write is finally rejected. If the total amount of messages in the list of active write messages exceeds 300 then every write message is performed only once not taking into account the **ConsecutiveWriteErrors** value.

The **ShowAllRejectedWrites** option is useful when communication with a separate topic (topics) is suspended by Item SUSPEND (see chapter **Item (Point) Naming**) and the Server rejects each write to this topic (topics). If **ShowAllRejectedWrites** = 1 then information about each rejected write value is displayed by the Server. If **ShowAllRejectedWrites** = 0 then the Server rejects each write to the suspended topics without logging any information.

SlowPollRetries and SlowPollInterval
The **SlowPollRetries** entry is used to enter the number of consecutive error retries for one topic (PLC). If after **SlowPollRetries** there is still no successful response from PLC, then this topic is changed to *slow poll mode*. The **SlowPollInterval** entry is used to enter the slow poll mode update interval (in seconds).

For example, the following entries can be used to specify that slow poll mode 2 minutes will start after 3 consecutive unsuccessful retries:

SlowPollRetries=3
SlowPollInterval=120

The **MaxUnsolicInTimerTic** entry is used to enter the number of Data Slave channels the Server will check for Unsolicited messages each time when enter a code. Valid values are 1...8.
The **MaxGlobalInTimerTic** entry is used to enter the number of Topics for which the Server will process Global data each time when enter a code. Valid values are 1...8.
The **MaxChannelInTimerTic** entry is used to enter the number of Data Master channels the Server tries to process each time when enter a code. Valid values are 1...8.
Note: *Real number of processed Data channels per scan also depends on created topic number, activated Item number, reserved channel number as well as free channel number in current moment. Neither the same Data Slave channel nor Data Master channel nor Global data area are processed twice per scan.*

The default values (they are used if WIN.INI file and do not contain these entries) are the following: **MultiWrite=0**, **ConsequtiveWriteErrors=3**, **ShowAllRejectedWrites=0**, **SlowPollRetries=2**, **SlowPollInterval=15**, **MaxUnsolicInTimerTick=5**, **MaxGlobalInTimerTick=1** and **MaxChannelInTimerTick=2**.

Troubleshooting menu

The following debugging choices are appended to the Server's System Menu (the menu that appears when you click on the "-" box in the upper left hand corner of the Server window):

Suspend Protocol / Resume Protocol - these choices permit you to turn protocol processing on and off, what means that you can suspend access to the PLC.

Show Send - if checked then all outgoing user data is displayed in hexadecimal format.

Show Receive - if checked then all incoming user data is displayed in hexadecimal format.

Show Errors - if checked then all information about errors is displayed.

ShowEvents- if checked then Server logs the information about situations when the total number of active (pending) write messages exceeds 300. It may happen when the Server has timing problems when executing write commands. When such warnings appear then it is recommended to modify the Server timing settings or to reduce the total amount of write data in the client application. Otherwise the possibility of loosing write data increases.
Information about suspended and resumed topics is displayed if **ShowEvents** is checked.

ShowBadWrites- if checked then the Server displays information about all situations when data write commands are not executed successfully and after **ConsecutiveWriteErrors** retries the write is rejected and write message is deleted from list of active (pending) write messages. This option (if checked) is effective even if other error logging is stopped.

Verbose - if checked then all information about errors (except errors indicated in other choices) is displayed. This option is useful for getting additional information about error situations when processing Global data as well as data accessible through Data Master channels:

VerboseUnsol - if checked then all information about errors (except errors indicated in other choices) is displayed. This option is useful for getting additional information about error situations when processing data accessible through Data Slave channels:

When this option is checked simultaneously with the option **Show Errors** then outgoing user data as well as incoming user data is displayed in addition to the error report. For some types of errors the Server gives explanation of possible error reason.
If client application closes communication with a topic then the Server immediately deletes all this topic's messages from message lists. If write messages are still in the list of active (pending) messages these write messages are deleted not trying to perform them. If **Verbose** option is checked simultaneously with the option **ShowBadWrites** then information about not performed and deleted write messages is displayed.

Dump - displays all information about Adapter cards, active topics and data items.

DumpScreen- if checked information about active topics and messages is displayed in KLMBPLUS main window.

All debug (except **DumpScreen** option) is displayed via the Wonderware Logger, which must be active for these commands to work.

Warning: if you check **Show Send** and/or **Show Receive** debug output grows very fast. Message strings you see in WWLogger file are not precisely the same the Server process to MBPLUS network. Strings contain additional information Bytes (Address, CRC) what allows checking communication.

KLINKMANN AUTOMATION
KLMBPLUS DDE Server
Revision History

Aug 97	Rev 1.0	First Release
Oct 97	Rev 1.1	Minor modifications in manual text
Sep 2000	Rev 1.2	Bit support for Global data added
Nov 2001	Rev 1.3	Support for PCI85 card with MBX drivers added
Mar 2002	Rev 1.4	Installation from CD information added
Jan 2003	Rev 1.5	Minor modifications in manual text
Jan 2003	Rev 1.6	Reply Timeout Global added. SlowPollRetries added